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F/SER31:JS  
SERO-2019-03788

Mr. Steven Craig James  
Environmental Manager  
Florida Department of Transportation, District 6  
1000 NW 111<sup>th</sup> Avenue  
Miami, Florida 33172-5800

Ref: SERO-2019-03788, Venetian Causeway Bridges, Miami-Dade County, Florida

Dear Mr. James:

The enclosed Biological Opinion (Opinion) was prepared by the National Marine Fisheries Service (NMFS) pursuant to Section 7(a)(2) of the Endangered Species Act (ESA). This consultation is being carried out with the Florida Department of Transportation (FDOT) pursuant to the Surface Transportation Project Delivery Program, 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016, and executed by FDOT and the Federal Highway Administration (FHWA). Under these authorities, FHWA has assigned, and FDOT has assumed, the responsibilities of the Secretary under the National Environmental Policy Act (NEPA) with respect to one or more highway projects within the State, and associated consultation responsibilities of the FHWA under the Endangered Species Act.

The Opinion considers the effects of a proposal to replace 11 of the 12 bridges comprising the Venetian Causeway. NMFS concludes that the proposed action may affect, but is not likely to adversely affect, green sea turtle (North and South Atlantic DPSs), hawksbill sea turtle, Kemp's ridley sea turtle, loggerhead sea turtle (Northwest Atlantic DPS), giant manta ray, and smalltooth sawfish (United States DPS). NMFS concludes that the proposed action is likely to adversely affect, but will not destroy or adversely modify, Johnson's seagrass designated critical habitat.

This project has been assigned the tracking number SERO-2019-03788 in the NMFS Environmental Consultation Organizer (ECO). Please refer to the ECO number in all future inquiries regarding this consultation. Please direct questions regarding this Opinion to Jennifer Schull, Consultation Biologist, by phone at (561) 440-1748, or by email at [Jennifer.Schull@noaa.gov](mailto:Jennifer.Schull@noaa.gov).

Sincerely,

Roy E. Crabtree, Ph.D.  
Regional Administrator

Enclosure:  
Biological Opinion

File: 1514-22.L.4



**Endangered Species Act - Section 7 Consultation  
Biological Opinion**

**Action Agency:** Federal Highway Administration

**Applicant:** Florida Department of Transportation, District 6

**Activity:** Venetian Causeway Bridge Replacements, Miami-Dade County, Florida

**Consulting Agency:** National Oceanic and Atmospheric Administration (NOAA),  
National Marine Fisheries Service (NMFS),  
Southeast Regional Office, Protected Resources Division (PRD),  
St. Petersburg, Florida

Consultation Tracking Number SERO-2019-03788

**Approved by:**

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Roy E. Crabtree, Ph.D., Regional Administrator  
NMFS, Southeast Regional Office  
St. Petersburg, Florida

**Date Issued:**

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**Acronyms and Abbreviations**

CFR	Code of Federal Regulations
DPS	Distinct Population Segment
ECO	NMFS Environmental Consultation Organizer
ESA	Endangered Species Act
EST	Environmental Screening Tool
ETDM	Efficient Transportation Decision Making
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
Opinion	Biological Opinion
PRD	NMFS Southeast Regional Office Protected Resources Division
U.S.	United States
USACE	U.S. Army Corps of Engineers

**Units of Measurement**

ac	acre(s)
ft <sup>2</sup>	square foot/feet
in	inch(es)
m	meter(s)
mi	miles

## **Introduction**

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Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 et seq.), requires that each federal agency ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. Section 7(a)(2) requires federal agencies to consult with the appropriate Secretary in carrying out these responsibilities. The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and the United States (U.S.) Fish and Wildlife Service share responsibilities for administering the ESA.

Consultation is required when a federal action agency determines that a proposed action “may affect” listed species or designated critical habitat. Consultations on most listed marine species and their designated critical habitat are conducted between the action agency and NMFS. Informal consultation is concluded after NMFS determines that the action is not likely to adversely affect listed species or critical habitat. Formal consultation is concluded after NMFS issues a Biological Opinion (“Opinion”) that identifies whether a proposed action is likely to jeopardize the continued existence of a listed species, or destroy or adversely modify critical habitat, in which case reasonable and prudent alternatives to the action as proposed must be identified to avoid these outcomes. The Opinion states the amount or extent of incidental take of the listed species that may occur, develops measures (i.e., reasonable and prudent measures) to reduce the effect of take, and recommends conservation measures to further the recovery of the species. No incidental destruction or adverse modification of designated critical habitat may be authorized, and thus there are no reasonable and prudent measures – only reasonable and prudent alternatives that must avoid destruction or adverse modification.

This document represents NMFS’s Opinion based on our review of impacts associated with the proposed action within Miami-Dade County, Florida. This Opinion analyzes the project’s effects on threatened and endangered species and designated critical habitat, in accordance with Section 7 of the ESA. We based our Opinion on project information provided by the Florida Department of Transportation (FDOT) and other sources of information, including the published literature cited herein.

## **1 CONSULTATION HISTORY**

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The following is the consultation history for ECO number SERO-2019-03788:

- August 17, 2010 – NMFS conducted a site visit.
- August 30, 2010 – NMFS uploaded Planning Screen comments to the FDOT Environmental Screening Tool (EST) (Efficient Transportation Decision Making (ETDM) #12756).
- October 4, 2011 – NMFS uploaded Programming Screen comments to the FDOT EST (ETDM #12756).
- June 27, 2017 – NMFS conducted a site visit with FDOT and its consultants.
- June 28, 2017 – NMFS participated in an inter-agency conference call with FDOT, its consultants, and other federal and state agencies.

- August 27, 2019 – FDOT, designated by the FHWA as the non-federal representative, requested informal consultation with NMFS.
- September 5, 2019 – FDOT withdrew its informal consultation request because information to complete the consultation was incomplete.
- September 16, 2019, October 9, 2019, and November 22, 2019 – NMFS, FDOT, and FDOT consultants participated in pre-application calls to discuss project details.
- December 20, 2019 – FDOT renewed its request for informal consultation with NMFS.
- February 5, 2020 - NMFS requested additional information from FDOT.
- March 24, 2020 – FDOT responded to the request for additional information (dated March 13, 2020), but the response was incomplete.
- April 6, 2020 – FDOT/NMFS convened a conference call to discuss the information that had been provided and additional information needs.
- June 5, 2020 – FDOT provided additional information and formal consultation was initiated that day.

## **2 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA**

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### **2.1 Proposed Action**

The Florida Department of Transportation (FDOT or the applicant) proposes to demolish, remove, and replace 11 of the 12 bridges that comprise the Venetian Causeway, a 2.5 mile (mi) corridor connecting the City of Miami to the City of Miami Beach, Florida (Financial Management Number: 422713-2-22-01). The Venetian Causeway includes ten fixed span bridges and two bascule leaf span bridges over the Intracoastal Waterway extending from North Bayshore Drive (City of Miami) to Purdy Avenue (City of Miami Beach). The current bridges were originally built in 1926 and are structurally deficient and deteriorating. While the bridges have been rehabilitated and repaired over the course of several years, the bridges exhibit severe deterioration because of their proximity to an aggressive marine environment. Due to their deteriorated condition and inability to adequately serve traffic demand, bridges 2 through 12 have been classified as functionally obsolete or structurally deficient. Bridge 1 has been replaced in phases and is not considered functionally obsolete or structurally deficient and is not part of the proposed action.

The project will be completed sequentially with work occurring on only 1 bridge at a time in order to maintain traffic flow. Existing bridges to be replaced will be cut into pieces and removed from the project site by cranes placed on the bridge approaches (on land) and on barges (over water). No blasting or explosives will be used. Dredging will be required for the removal of the existing substructure to 2 feet (ft) below the mudline and for clearing area for the new bascule piers. New bridge sections will be constructed using barges and land based construction. Barges will not be allowed to spud within seagrass habitat. Up to 4 barges will be used at a time over the course of the project.

Once completed, the new bridges will be supported by 282 48-inch (in) drilled shafts. Up to 980 linear feet of sheet piles (either 22-in or 24-in long, each) will be used to support existing structures during construction. The sheet piles and drilled shaft caissons will be installed using vibratory hammer. Vibratory hammer will only be used during daylight hours and a maximum of 5 sheet piles or 1 drilled shaft caisson will be installed per day.

The new fixed span bridges (bridges 2-9, and 11-12) will be widened by approximately 16 ft and raised 1 ft above the existing clearance. The bascule bridge (bridge 10) will be widened by approximately 16 ft and will have a vertical clearance of 13.5 ft above mean high water in the closed position. Up to 8,536 square feet (ft<sup>2</sup>) of material will be dredged in association with this project using an excavator, and turbidity barriers will surround the work area. All dredged spoils will be disposed of in an off-site upland location. Approximately 2,400 ft<sup>2</sup> of riprap will be installed at the 10 fixed bridge approaches where they meet the causeways and the sheet piles will be installed 2 ft behind the riprap. Construction is expected to take 1,460 calendar days (48 months). The applicant will comply with *NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions*.<sup>1</sup> Upon completion, the proposed action may result in additional vehicular traffic, since 1 of the bridges has been de-rated and heavier vehicles are not allowed at this time.

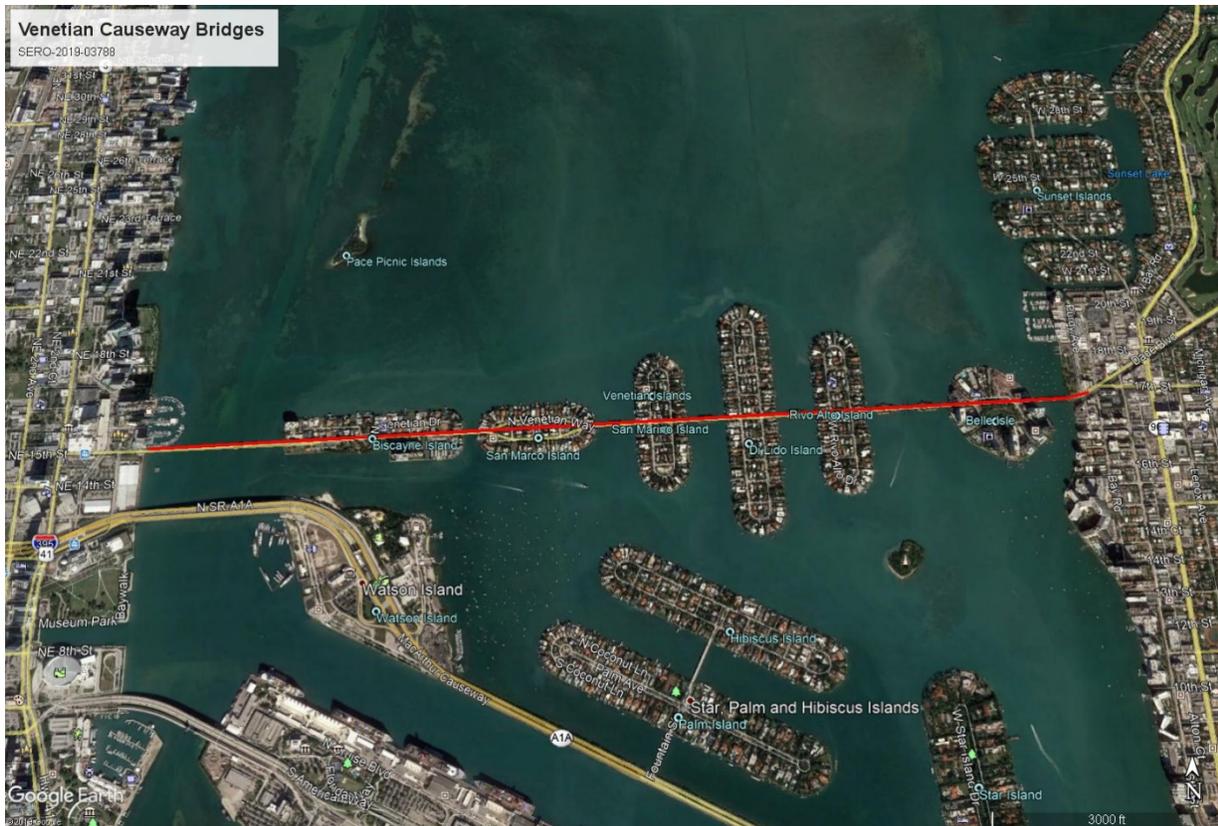
## 2.2 Action Area

The proposed project site is located along the Venetian Causeway connecting the City of Miami with the City of Miami Beach in Miami-Dade County, Florida (25.790616°N, 80.164336°W [North American Datum 1983 (NAD83)] in Biscayne Bay, approximately 2 mi north of Government Cut, the nearest opening to the Atlantic Ocean (Figure 1).

The project site consists of 12 bridges connecting highly-developed spoil islands and causeways. The FDOT proposes to replace 11 of the bridges. The water depth at the project site ranges from 8 ft – 15 ft. The shoreline is comprised of riprap, rubble, and hard debris in the shallow water, and gives way to sand/shell and scattered rubble habitat that supports macroalgae, sponges, octocorals, and tunicates. The area experiences high-velocity currents. FDOT and its contractors performed a benthic survey in July 2017. Approximately 0.06 acres (ac) of seagrass (paddle grass and shoal grass) was documented within the project corridor (but not within 40 ft of any existing bridge). The project is within designated critical habitat for Johnson's seagrass, but no Johnson's seagrass was observed. White and red mangroves were also observed within the corridor, but no impacts to mangroves are expected from this project. In addition, no ESA-listed corals are present in the project site.

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<sup>1</sup> NMFS. 2006. Sea Turtle and Smalltooth Sawfish Construction Conditions revised March 23, 2006. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, Saint Petersburg, Florida. *Sea Turtle and Smalltooth Sawfish Construction Conditions*.



**Figure 1. Image of the project location (red line) and surrounding area (©2020 Google)**

The action area is defined by regulation as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action” (50 Code of Federal Regulations [CFR] 402.02). As such, the action area includes the areas in which construction will take place, as well as the immediate surrounding areas that may be affected by noise generated from pile driving. Thus, the action area is equivalent to the radius of noise effects to ESA-listed species that are expected to result from the installation of steel sheet piles and caissons using a vibratory hammer, which in this case is a 706.8-ft behavioral noise radius.

### **3 STATUS OF LISTED SPECIES AND CRITICAL HABITAT]**

Table 1 provides the effect determinations for ESA-listed species the FDOT and/or NMFS believe may be affected by the proposed action.

**Table 1. Effects Determination(s) for Species the Action Agency and/or NMFS Believe May Be Affected by the Proposed Action**

Species	ESA Listing Status <sup>2</sup>	FDOT Effect Determination	NMFS Effect Determination
<b>Sea Turtles</b>			
Green (North Atlantic [NA] distinct population segment [DPS])	T	NLAA	NLAA
Green (South Atlantic [SA] DPS)	T	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA
Leatherback	E	NLAA	NE
Loggerhead (Northwest Atlantic [NWA] DPS)	T	NLAA	NLAA
Hawksbill	E	NLAA	NLAA
<b>Fish</b>			
Smalltooth sawfish (U.S. DPS)	E	NLAA	NLAA
Giant manta ray	T	ND	NLAA
<b>Invertebrates and Marine Plants</b>			
Elkhorn coral ( <i>Acropora palmata</i> )	T	NLAA	NP
Staghorn coral ( <i>Acropora cervicornis</i> )	T	NLAA	NP
Johnson's seagrass	T	NLAA	NP

We believe the proposed action will have no effect on leatherback sea turtles due to the species' very specific life history strategy, which is not supported at the site. Leatherback sea turtles have a pelagic, deepwater life history, where they forage primarily on jellyfish. We would not expect elkhorn or staghorn coral or Johnson's seagrass to be affected by the proposed action because these species were not observed during the benthic survey of this site. Giant manta rays may be found within the action area but an effects determination was not made by the action agency.

Table 2 provides the effects determinations for designated critical habitat occurring in the action area that FDOT and NMFS believe may be affected by the proposed action.

**Table 2. Effects Determinations for Designated Critical Habitat the Action Agency and/or NMFS Believe May Be Affected by the Proposed Action**

Critical Habitat	Unit	FDOT Effect Determination	NMFS Effect Determination
Johnson's seagrass	Unit J	Likely to adversely affect	Likely to adversely affect, will not destroy or adversely modify

<sup>2</sup> E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect; NE = no effect; NP = not present, ND = no determination

### 3.1 Potential Routes of Effect Not Likely to Adversely Affect Listed Species

We believe that sea turtles (green, Kemp's ridley, loggerhead and hawksbill), giant manta rays, and smalltooth sawfish may be found in or near the action area and may be affected by the proposed action covered in this Opinion. We have identified the following potential adverse effects to these species and concluded that they are not likely to be adversely affected by the proposed action for the reasons described below.

Effects to sea turtles (green, Kemp's ridley, loggerhead and hawksbill), giant manta rays, and smalltooth sawfish include the potential for injury from construction equipment or materials. We believe this effect is extremely unlikely to occur. Because these species are highly mobile, we expect these species to move away from the action area if disturbed. The applicant's implementation of *NMFS's Sea Turtle and Smalltooth Sawfish Construction Conditions*<sup>1</sup> will further reduce the risk of injuries by requiring all construction workers to watch for sea turtles and smalltooth sawfish. Operation of any mechanical construction equipment will cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of moving equipment. Activities will not resume until the protected species has departed the project area of its own volition.

NMFS has previously determined in dredging Opinions (NMFS 1991; NMFS 1995; NMFS 1997; NMFS 2003) that non-hopper type dredging methods (e.g., clamshell or bucket dredging, cutterhead dredging, pipeline dredging) are slower than hopper dredge equipment and unlikely to adversely affect sea turtles and smalltooth sawfish. While giant manta rays were not considered in those previous Opinions, like sea turtles and smalltooth sawfish, giant manta rays are highly mobile species and can avoid interactions with these slow moving dredge types. Further, NMFS believes that sea turtles, giant manta rays and smalltooth sawfish are likely to avoid the areas during construction due to the noise and associated disturbances. Thus, NMFS believes that because this proposed action will use either clamshell or other form of mechanical dredging, it is extremely unlikely that an ESA-listed species could be injured or lethally entrained in the dredge equipment.

The action area contains shallow water habitat that may be used by sea turtles, giant manta rays, and smalltooth sawfish. Sea turtles, giant manta rays, and smalltooth sawfish may be affected by their inability to access the habitat within the action area due to their avoidance of construction activities, noise and associated disturbances, and physical exclusion from the action area due to turbidity barriers. We believe habitat displacement effects to sea turtles, giant manta rays, and smalltooth sawfish will be insignificant given the proposed action will be temporary and intermittent (e.g., construction on each bridge will be sequential over a 4-year time period and vibratory hammer work will occur during daylight hours only) and will only occur within a relatively small area adjacent to otherwise open water and useable habitat. In addition, because these species are mobile, we expect that they will move away from construction activities and use adjacent areas in Biscayne Bay with similar habitat.

Sea turtles and smalltooth sawfish may temporarily lose forage habitat such as seagrass and encrusting marine organisms such as sponges, tunicates, corals, sea-whips, gorgonians, and algae that are established on concrete pilings, seawalls, riprap, and rubble throughout the project corridor. Giant manta rays may temporarily lose forage habitat in open water. We believe loss

of forage habitat will be insignificant given the availability of similar habitat nearby and the reasonable expectation that these organisms will recruit and grow within the project corridor after completion of the project.

Effects to listed species as a result of noise created by construction activities can physically injure animals in the affected areas or change animal behavior in the affected areas. Injurious effects can occur in 2 ways. First, immediate adverse effects can occur to listed species if a single noise event exceeds the threshold for direct physical injury. Second, effects can result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these can constitute adverse effects if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse if such effects interfere with animals migrating, feeding, resting, or reproducing, for example. Our evaluation of effects to listed species as a result of noise created by construction activities is based on the analysis prepared in support of the Opinion for SAJ-82.<sup>3</sup> The noise analysis in this consultation evaluates effects to ESA-listed fish and sea turtles identified by NMFS as potentially affected in the table above.<sup>4</sup>

Based on our noise calculations, which use the best available data for calculating injuries to ESA-listed species fish and sea turtles, installation of 24-in metal sheet piles by vibratory hammer will not result in any form of injurious noise effects. Installation of 24-in metal sheet piles by vibratory hammer could result in behavioral effects at radii of 52 ft (16 meters (m)) for sea turtles and 243 ft (74 m) for ESA-listed fishes. Given the mobility of sea turtles and ESA-listed fish species, we expect them to move away from noise disturbances. Because there is similar habitat nearby, we believe this effect will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during pile installation. Since installation will occur only during the day, these species will be able to resume normal activities during quiet periods between pile installations and at night. Therefore, installation of metal sheet piles by vibratory hammer will not result in any injurious noise effect, and we anticipate any behavioral effects will be insignificant.

Based on our noise calculations, which use the best available data for calculating injuries to ESA-listed species fish and sea turtles, installation of 48-in metal drilled shaft caissons<sup>5</sup> by vibratory hammer will not cause single-strike or peak-pressure injurious noise effects. However, the cumulative sound exposure level over the course of a day may cause injury to ESA-listed fishes and sea turtles up to 1.7 ft (0.5 m) away from the pile. Due to the mobility of sea turtles and ESA-listed fish species, and because the project occurs in open water, we expect them to move away from noise disturbances. Because we anticipate the animal will move away, we believe that an animal's suffering physical injury from noise is extremely unlikely to occur. An animal's movement away from the injurious sound radius is a behavioral response, with the same effects discussed below.

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<sup>3</sup> NMFS. Biological Opinion on Regional General Permit SAJ-82 (SAJ-2007-01590), Florida Keys, Monroe County, Florida. June 10, 2014.

<sup>4</sup> While NMFS does not have information regarding noise effects specific to giant manta rays, we believe that effects to giant manta rays from pile driving noise would be very similar to effects on smalltooth sawfish (which are considered in SAJ-82), because both species are elasmobranchs and lack swim bladders.

<sup>5</sup> Noise calculations for 48-in metal drilled shaft caissons are based on 72-in diameter steel pipe.

The installation of metal caissons by vibratory hammer could also result in behavioral effects at radii 706.8 ft (215.4 m) for ESA-listed fishes and 152.3 ft (46.4 m) for sea turtles. Due to the mobility of sea turtles and ESA-listed fish, we expect them to move away from noise disturbances in this open-water environment. Because there is similar habitat nearby in Biscayne Bay, we believe behavioral effects will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during metal caisson installation. Since only one caisson will be installed per day and installation will occur only during the day, these species will be able to resume normal activities during quiet periods between installations and at night. Therefore, we anticipate any behavioral effects will be insignificant.

### **3.2 Designated Critical Habitat Likely To Be Adversely Affected**

The term “critical habitat” is defined in Section 3(5)(A) of the ESA as (i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (1) essential to the conservation of the species and (2) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. “Conservation” is defined in Section 3(3) of the ESA as “...the use of all methods and procedures that are necessary to bring any endangered or threatened species to the point at which listing under the ESA is no longer necessary.”

#### **3.2.1 Johnson’s Seagrass Critical Habitat**

##### *Description*

NMFS designated Johnson’s seagrass critical habitat on April 5, 2000 (65 FR 17786; see also, 50 CFR 226.213). The specific areas occupied by Johnson’s seagrass and designated by NMFS as critical habitat are those with 1 or more of the following criteria:

1. Locations with populations that have persisted for 10 years
2. Locations with persistent flowering populations
3. Locations at the northern and southern range limits of the species
4. Locations with unique genetic diversity
5. Locations with a documented high abundance of Johnson’s seagrass compared to other areas in the species’ range

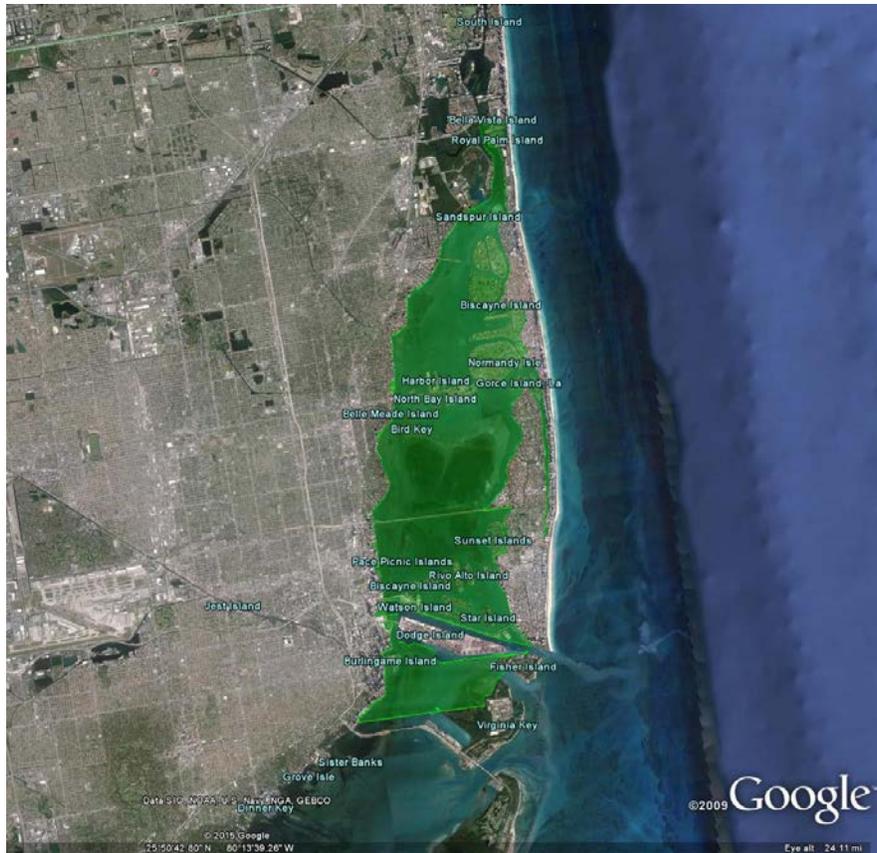
Ten areas (Units) within the range of Johnson’s seagrass (approximately 200 kilometers of coastline from Sebastian Inlet to northern Biscayne Bay, Florida) are designated as Johnson’s seagrass critical habitat (Table 3). The total range-wide acreage of critical habitat for Johnson’s seagrass is roughly 22,574 ac (NMFS 2002).

**Table 3. Designated Critical Habitat Units for Johnson’s Seagrass**

<b>Unit</b>	<b>Location/Area</b>
<b>A</b>	A portion of the Indian River, Florida, north of the Sebastian Inlet Channel
<b>B</b>	A portion of the Indian River, Florida, south of the Sebastian Inlet Channel
<b>C</b>	A portion of the Indian River Lagoon, Florida, in the vicinity of the Fort Pierce Inlet
<b>D</b>	A portion of the Indian River Lagoon, Florida, north of the St. Lucie Inlet
<b>E</b>	A portion of Hobe Sound, Florida, excluding the federally marked navigation channel of the Intracoastal Waterway
<b>F</b>	A portion of the south side of Jupiter Inlet, Florida
<b>G</b>	A portion of Lake Worth, Florida, north of Bingham Island
<b>H</b>	A portion of Lake Worth Lagoon, Florida, located just north of the Boynton Inlet
<b>I</b>	A portion of northeast Lake Wyman, Boca Raton, Florida, excluding the federally marked navigation channel of the Intracoastal Waterway
<b>J</b>	A portion of northern Biscayne Bay, Florida, including all parts of the Biscayne Bay Aquatic Preserve excluding the Oleta River, Miami River, and Little River beyond their mouths, the federally marked navigation channel of the Intracoastal Waterway, and all existing federally authorized navigation channels, basins, and berths at the Port of Miami to the currently documented southernmost range of Johnson’s seagrass, Central Key Biscayne

*Critical Habitat Unit Impacted by this Action*

This consultation focuses on an activity that occurs in Unit J, which encompasses the northern portion of Biscayne Bay from Northeast 163<sup>rd</sup> Street south to Central Key Biscayne at 25°45' N (Figure 2). This portion of Biscayne Bay is bound by heavy residential and commercial development, though a few areas of mangrove shoreline remain. Dredge and fill projects have resulted in a number of spoil islands and channels too deep for seagrass growth. Biscayne Bay supports a diversity of biological communities including intertidal wetlands, seagrasses, hard bottom, assemblages, and open water. Unit J is wholly within the Biscayne Bay Aquatic Preserve.



**Figure 2. Johnson's seagrass critical habitat Unit J (©2015 Google, Data SIO, NOAA, U.S. Navy, NGA, GEBCO)**

### *Essential Features of Critical Habitat*

NMFS identified 4 habitat features essential for the conservation of Johnson's seagrass: (1) adequate water quality, defined as being free from nutrient over-enrichment by inorganic and organic nitrogen and phosphorous or other inputs that create low oxygen conditions; (2) adequate salinity levels, indicating a lack of very frequent or constant discharges of fresh or low-salinity waters; (3) adequate water transparency, which would allow sunlight necessary for photosynthesis; and (4) stable, unconsolidated sediments that are free from physical disturbance. All 4 essential features must be present in an area for it to function as critical habitat for Johnson's seagrass.

### *Status and Threats*

A wide range of activities, many funded authorized or carried out by federal agencies, have and will continue to affect the essential habitat requirements of Johnson's seagrass. These are generally the same activities that may affect the species itself, and include: (1) vessel traffic and the resulting propeller dredging; (2) dredge and fill projects; (3) dock, marina, and bridge construction; (4) water pollution; and (5) land use practices (shoreline development, agriculture, and aquaculture).

Vessel traffic has the potential to affect Johnson's seagrass critical habitat by reducing water transparency. Operation of vessels in shallow water environments often leads to the suspension of sediments due to the spinning of propellers on or close to the bottom. Suspended sediments reduce water transparency and the depth to which sunlight penetrates the water column. Populations of Johnson's seagrass that inhabit shallow water and water close to inlets where vessel traffic is concentrated, are likely to be most affected. This effect is expected to worsen with increases in boating activity.

The dredging of bottom sediments to maintain, or in some cases create, inlets, canals, and navigation channels can directly affect essential features of Johnson's seagrass critical habitat. Dredging results in turbidity through the suspension of sediments. As discussed previously, the suspension of sediments reduces water transparency and the depth to which sunlight can penetrate the water column. The suspension of sediments from dredging can also re-suspend nutrients, which could result in over-enrichment and/or reduce dissolved oxygen levels. Further, dredging can destabilize sediments and alter both the shape and depth of the bottom within the dredged footprint. This may affect the ability of the critical habitat to function through the removal or modification of essential features.

Dock, marina, and bridge construction leads to loss of habitat via construction impacts (e.g., pile installation) and shading. Similar to dredging, installation of piles for docks or bridges can result in increased turbidity that can negatively impact water transparency over short durations. Additionally, installed piles also replace the stable, unconsolidated bottom sediments essential for the species. Completed structures can have long-term effects on critical habitat in the surrounding area because of the shade they produce. While shading does not affect water transparency directly, it does affect the amount and/or duration of sunlight that can reach the bottom. The threat posed by dock, marina, and bridge construction is especially apparent in coastal areas where Johnson's seagrass is found.

Other threats include inputs from adjacent land use. Johnson's seagrass critical habitat located in proximity to rivers, canal mouths, or other discharge structures is affected by land use within the watershed. Waters with low salinity that are highly colored and often polluted are discharged to the estuarine environment. This can impact salinity, water quality, and water transparency, all essential features of Johnson's seagrass critical habitat. Frequent pulses of freshwater discharge to an estuarine area may decrease salinity of the habitat and provoke physiological stress to the species. Nutrient over-enrichment, caused by inorganic and organic nitrogen and phosphorous loading via urban and agricultural land run-off, stimulates increased algal growth, decreased water transparency, and diminished oxygen content within the water. Low oxygen conditions have a demonstrated negative impact on seagrasses and associated communities. Discharges can also contain colored waters stained by upland vegetation or pollutants. Colored waters released into these areas reduce the amount of sunlight available for photosynthesis by rapidly reducing the amount of shorter wavelength light that reaches the bottom. In general, threats from adjacent land use will be ongoing, randomly occurring events that follow storm events.

## 4 ENVIRONMENTAL BASELINE

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By regulation, the environmental baseline for an Opinion refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process. The consequences to the listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

### 4.1 Status of Designated Critical Habitat within the Action Area

As discussed above, this Opinion focuses on an activity occurring in Unit J of Johnson's seagrass designated critical habitat, which encompasses the northern portion of Biscayne Bay from North East 163<sup>rd</sup> Street south to Central Key Biscayne at 25°45'N. The project site is the Venetian Causeway, a grouping of 12 consecutive bridges connecting the City of Miami to City of Miami Beach across developed man-made islands and small spoil islands. A benthic assessment was performed in July 2017. Johnson's seagrass was not observed. The depth within the action area ranges from 8-15 ft. The substrate is sand/shell bottom with riprap and rubble.

### 4.2 Factors Affecting Johnson's Seagrass Designated Critical Habitat Within the Action Area

#### *Federal Actions*

A wide range of activities funded, authorized, or carried out by federal agencies may affect the essential features of designated critical habitat for Johnson's seagrass. These include actions permitted or implemented by the U.S. Army Corps of Engineers (USACE) such as dredging, dock/marina construction, bridge/highway construction, residential construction, shoreline stabilization, breakwaters, and/or the installation of subaqueous lines or pipelines. Other federal activities that may affect Johnson's seagrass critical habitat include actions by the Environmental Protection Agency and the USACE to manage freshwater discharges into waterways, management of Biscayne Bay Aquatic Preserve, regulation of vessel traffic to minimize propeller dredging and turbidity, and/or other activities by the U.S. Coast Guard and U.S. Navy. Although these actions have adversely affected Johnson's seagrass critical habitat, none of these past actions have destroyed or adversely modified Johnson's seagrass critical habitat. Other than the proposed action, the following federally permitted projects in Table 4 are known to have occurred or have had effects to Johnson's seagrass designated critical habitat within the action area, as per a review of the NMFS Protected Resources Division's (PRD's) completed consultation database by the consulting biologist on August 25, 2020. All of these projects resulted in a determination of may affect, and is likely to adversely affect, but not destroy or adversely modify Johnson's seagrass designated critical habitat.

**Table 4. Federal Actions within Action Area with Impacts to Johnson’s Seagrass Critical Habitat**

<b>Action Agency Identifier</b>	<b>NMFS Identifier</b>	<b>Name of Project</b>	<b>Biological Opinion Date</b>	<b>Project Summary</b>	<b>Impact to Johnson’s Seagrass Critical Habitat</b>
SAJ-2016-00350	SER-2016-18002	Karim Masri – Dock Project	7/21/2017	Installation of wood, concrete and metal dock and piles and 1 new boat slip	390 ft <sup>2</sup> (0.009 ac)
SAJ-2016-01403	SERO-2019-01951	Venetian Land Ventures	8/27/2020	Installation of wood dock and piles and 1 new boat slip	303.16 ft <sup>2</sup> (0.007 ac)
SAJ-2015-02850	SER-2016-17781	Andre Radandt-Docking Project	7/19/2017	Installation of wood, concrete and metal dock and piles	499.5 ft <sup>2</sup> (0.011 ac)
SAJ-2014-00162	SER-2014-13935	Richard & Maria Moraes – Dock Project	11/17/15	Installation of wood dock and piles and reduction from 2 boat slips to 1	740 ft <sup>2</sup> (0.017 ac)
SAJ-2014-00390	SER-2014-14568	Michael Comras – Docking Project	7/1/15	Installation of wood dock and piles and 3 new boat slips	1084 ft <sup>2</sup> (0.025 ac)
SAJ-2012-03476	SER-2013-11220	Mark Gold – Seawall/Dock Project	4/10/17	Installation of concrete and metal dock, seawall, and one boat slip	968 ft <sup>2</sup> (0.022 ac)
SAJ-2007-02395	SER-2016-17648	Marcos Macias – Dock Project	4/7/17	Installation of wood dock and 5 boat slips	3259 ft <sup>2</sup> (0.075 ac)

*Private Recreational Vessel Traffic*

Marina and dock construction increases recreational vessel traffic within areas of Johnson’s seagrass critical habitat, which increases suspended sediments from propellers and could result in propeller dredging. As mentioned above, suspended sediments are known to adversely affect Johnson’s seagrass critical habitat by reducing the water transparency essential feature. Shading from dock structures and vessel mooring also affects the water transparency essential feature of the designated critical habitat. Propeller dredging and installation of piles and dock support structures may adversely affect Johnson’s seagrass critical habitat and permanently remove the unconsolidated sediments essential feature of the critical habitat.

*Marine Pollution and Environmental Contamination*

The project is located in a highly-developed coastal area in Biscayne Bay. This can lead to freshwater discharges and nutrient over-enrichment due to coastal runoff and man-made canal discharges into the bay. Freshwater discharge from canals may affect the salinity essential feature of the designated critical habitat while excess nutrients can lead to decreased water transparency and decreased dissolved oxygen content in the water.

## *State and Federal Activities That May Benefit Johnson's Seagrass Critical Habitat in the Action Area*

State and federal conservation measures exist to protect Johnson's seagrass and its habitat under an umbrella of management and conservation programs that address seagrasses in general (Kenworthy et al. 2006). These conservation measures must be continually monitored and assessed to determine if they will ensure the long-term protection of the species and the maintenance of environmental conditions suitable for its continued existence throughout its geographic distribution.

## **5 EFFECTS OF THE ACTION ON CRITICAL HABITAT**

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Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02).

The action area is within the boundary of Johnson's seagrass critical habitat (Unit J), and all 4 essential features are present at the project site. The 4 habitat features essential to the conservation of Johnson's seagrass are: (1) adequate water quality, defined as being free from nutrient over-enrichment by inorganic and organic nitrogen and phosphorous or other inputs that create low oxygen conditions; (2) adequate salinity levels, indicating a lack of very frequent or constant discharges of fresh or low-salinity waters; (3) adequate water transparency, which would allow sunlight necessary for photosynthesis; and (4) stable, unconsolidated sediments that are free from physical disturbance. All 4 essential features must be present in an area for it to function as critical habitat for Johnson's seagrass and the loss of 1 essential feature of Johnson's seagrass critical habitat will result in a total loss in the conservation function of the critical habitat in that area.

The adequate water quality and adequate water transparency essential features of Johnson's seagrass critical habitat may be affected by increased turbidity due to dredging, drilled shaft installation and vibratory hammer installation of caissons and sheet piles; however, we believe this effect will be insignificant. Best Management Practices (BMPs) for controlling turbidity will be used wherever practical. Any outstanding turbidity is expected to be temporary, and will be contained by turbidity curtains when practical, and will dissipate quickly due to high current velocities in the area.

We believe the proposed action will have no effect on the adequate salinity levels essential feature of Johnson's seagrass designated critical habitat because the proposed action lacks any potential to affect adequate salinity levels in the action area.

The proposed action is likely to adversely affect Johnson's seagrass critical habitat by removing the adequate water transparency essential feature due to shading from the widened bridges. In addition, we believe the proposed action is likely to adversely affect Johnson's seagrass critical habitat by removing or disrupting the stable, unconsolidated sediments essential feature by construction of the new bridges, dredging, and installing riprap.

First, we consider loss of the adequate water transparency essential feature. The adequate water transparency essential feature of Johnson's seagrass critical habitat may be affected by shading from the new, wider bridges. We only expect adverse effects in the area immediately underneath the bridges, as any shading to nearby areas will be temporary in nature (i.e., shading and light transmission will change over the course of the day) and therefore insignificant. In order to calculate adverse impacts from shading from the bridges, we consider the area of the new bridges (128,937.6 ft<sup>2</sup>) minus the area of the existing bridges (93,218.4 ft<sup>2</sup>), which is already shaded and not functioning as critical habitat. Thus, we believe the new bridges will adversely affect 35,719.2 ft<sup>2</sup> of Johnson's seagrass critical habitat from the permanent removal of the adequate water transparency essential feature.

Next, we consider the permanent loss of the stable, unconsolidated sediments essential feature from 1) the removal of the existing bridge structures and substructures, 2) the installation of drilled shafts, 3) dredging, 4) installation of riprap, and 5) installation of sheet piles. The existing piles occupy approximately 632 ft<sup>2</sup> of the seafloor will be cut -2 ft below the seafloor which would open up new stable, unconsolidated sediments for colonization by Johnson's seagrass. The new drilled shaft piles to support the bridges will occupy 3,542 ft<sup>2</sup> of seafloor. However, it is not necessary to calculate the impact to the stable unconsolidated sediments essential feature of critical habitat from installation of drilled shafts because the piles are located under the bridge decking within the shaded footprint of the new bridges (which has already been counted as a loss of critical habitat from the permanent removal of the adequate water transparency essential feature). While the project will require 8,536 ft<sup>2</sup> of dredging, 5,090 ft<sup>2</sup> of this dredging is within the shading of the existing bridge footprint and is not functioning as critical habitat. Therefore, the additional impact to the stable unconsolidated sediments essential feature from dredging will be 3,446 ft<sup>2</sup> (8,536 ft<sup>2</sup>-5,090 ft<sup>2</sup>). The project is expected to install 2,400 ft<sup>2</sup> of riprap around the bridge approaches on the causeways resulting in the permanent loss of 2,400 ft<sup>2</sup> of the stable unconsolidated sediments essential feature. None of the riprap will be installed under the shaded area of the existing bridges. Finally, there will be 980 linear feet of new metal sheet piles installed to support the bridges during construction. The sheet piles are approximately 0.6 inches (.05 ft) thick, which will occupy 49 ft<sup>2</sup> of seafloor. Therefore, the installation of metal sheet piles will impact 49 ft<sup>2</sup> of the stable unconsolidated sediments essential feature.

Barges will be used throughout the duration of this project and will be spudding throughout the project corridor within Johnson's seagrass critical habitat. The cumulative footprint of this spudding is expected to be 2,234 ft<sup>2</sup>. However, these impacts will be short in duration and are not expected to have permanent impacts to critical habitat. Therefore, these temporary spudding impacts are insignificant and are not included in the estimates of permanent impacts to critical habitat.

Together, installation of riprap, metal sheet piles and dredging will adversely affect 5,895 ft<sup>2</sup> of Johnson's seagrass critical habitat by permanently removing the stable, unconsolidated sediments essential feature from additional areas that will not be impacted by shading from the bridges.

Combining the total impacts to Johnson's seagrass critical habitat from the loss of the stable, unconsolidated sediments essential feature (5895 ft<sup>2</sup>) and the adequate water transparency essential feature (35,719.2 ft<sup>2</sup>), we believe the project will adversely affect 41,614.2 ft<sup>2</sup> (0.96 ac)<sup>6</sup> of Johnson's seagrass critical habitat.

## 6 CUMULATIVE EFFECTS

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Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA and 50 CFR 402.14.

NMFS is not aware of any future projects that may contribute to cumulative effects. Within the action area, major future changes are not anticipated beyond the ongoing activities and processes described in the environmental baseline. The present human uses of the action area are expected to continue, though some may occur at increased levels, frequency, or intensity in the near future. Dock and marina construction will likely continue at current rates, with associated loss and degradation of seagrass habitat, including Johnson's seagrass critical habitat. Because these activities are subject to USACE permitting and thus, the ESA Section 7 consultation requirement, they do not lead to cumulative non-federal effects to be discussed in this section. NMFS and the USACE have developed protocols to encourage the use of light-transmitting materials in future construction of docks constructed in or over submerged aquatic vegetation, marsh or mangrove habitat.<sup>7,8,9</sup> Even if all new docks are constructed in full compliance with the NMFS and USACE's guidance, NMFS acknowledges that shading impacts, and thus, impacts to the water transparency essential feature, to Johnson's seagrass will continue via dock construction. As NMFS and the USACE continue to encourage permit applicants to design and construct new docks in full compliance with the construction guidelines discussed above, and the recommendations in Adam (2012), Landry et al. (2008), and Shafer et al. (2008), NMFS believes that shading impacts to Johnson's seagrass will be reduced in the short- and long-term. Moreover, even with some shading from grated construction materials, researchers have found all 4 essential features necessary for Johnson's seagrass to persist under docks constructed of grated decking (Landry et al. 2008).

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<sup>6</sup> 1 square foot = 0.0000229568 acres. Therefore, 41,614.2 ft<sup>2</sup> x (0.0000229568 ac/1ft<sup>2</sup>) = 0.9553 ac.

<sup>7</sup> Project Design Criteria A2.17 in U.S. Army Corps of Engineers Jacksonville District's Programmatic Biological Opinion (JAXBO) issued by NMFS on November 20, 2017 (SER-2015-17616)

<sup>8</sup> Dock Construction Guidelines in Florida for Docks or Other Minor Structures Constructed in or over Submerged Aquatic Vegetation (SAV), Marsh or Mangrove Habitat U.S. Army Corps of Engineers/National Marine Fisheries Service, dated August 2001

<sup>9</sup> Key for Construction Conditions for Docks or Other Minor Structures Constructed in or Over Johnson's Seagrass (*Halophila johnsonii*) National Marine Fisheries Service/U.S. Army Corps of Engineers, dated October 2002

Upland development and associated runoff will continue to degrade the water quality essential feature necessary for Johnson's seagrass critical habitat. Flood control and imprudent water management practices will continue to result in freshwater inputs into estuarine systems, thereby degrading and altering the water quality and salinity essential features of Johnson's seagrass critical habitat.

Increased recreational vessel traffic will continue to result in damage to Johnson's seagrass and its designated critical habitat by improper anchoring, propeller scarring, and accidental groundings. Nonetheless, we expect that ongoing boater education programs and posted signage about the dangers to seagrass habitat from propeller scarring and improper anchoring may reduce impacts to Johnson's seagrass designated critical habitat, including that in Unit J.

## **7 DESTRUCTION/ADVERSE MODIFICATION ANALYSIS**

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NMFS's regulations define *destruction or adverse modification* to mean "a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species." (50 CFR 402.02). NMFS will generally conclude that a Federal action is likely to "destroy or adversely modify" designated critical habitat if the action results in an alteration of the quantity or quality of the essential physical or biological features of designated critical habitat, or that precludes or significantly delays the capacity of that habitat to develop those features over time, and if the effect of the alteration is to appreciably diminish the value of critical habitat for the conservation of the species. This analysis takes into account the geographic and temporal scope of the proposed action, recognizing that "functionality" of critical habitat necessarily means that it must now and must continue in the future to support the conservation of the species and progress toward recovery. Destruction or adverse modification does not depend strictly on the size or proportion of the area adversely affected, but rather on the role the action area serves with regard to the function of the overall designation, and how that role is affected by the action.

Recovery for Johnson's seagrass as set forth in the final recovery plan (NMFS 2002), will be achieved when the following recovery objectives are met:

- (1) The species' present geographic range remains stable for at least 10 years, or increases.
- (2) Self-sustaining populations are present throughout the range at distances less than or equal to the maximum dispersal distance to allow for stable vegetative recruitment and genetic diversity.
- (3) Populations and supporting habitat in its geographic range have long-term protection (through regulatory action or purchase acquisition).

We evaluated the proposed action's expected effects on critical habitat to determine whether it will be able to continue to provide its intended functions in achieving these recovery objectives and supporting the conservation of the species.

The first recovery objective for Johnson's seagrass is for the present range of the species to remain stable for 10 years or to increase during that time. In the 5-year review (2007) of the status of the species, NMFS concluded that the first recovery objective had been achieved as of 2007. In fact, the species range had increased slightly northward at that time. We have no

information indicating range stability has decreased since then. We determined that the proposed action will adversely affect a total of 41,614.2 ft<sup>2</sup> (0.96 ac) of Johnson's seagrass designated critical habitat. However, the action area is not at a boundary of the species' range, the affected area is very small, and the loss of this area for potential colonization will not affect the stability of the species' range now or in the future. Thus, we believe the proposed action's effects will not affect the critical habitat's ability to contribute to range stability for Johnson's seagrass.

The second recovery objective for Johnson's seagrass requires that self-sustaining populations be present throughout the range at distances less than or equal to the maximum dispersal distance for the species. Due to its asexual reproductive mode, self-sustaining populations are present throughout the range of species. As discussed above in the Designated Critical Habitat Likely to be Adversely Affected section, there are approximately 22,574 ac of Johnson's seagrass critical habitat. The loss of 41,614.2 ft<sup>2</sup> (0.96 ac) of designated critical habitat for Johnson's seagrass would equate to a loss of 0.0042% of Johnson's seagrass critical habitat ( $0.96 \text{ ac} \div 22,574 \text{ ac} \times 100$ ). In addition, within the action area, 7 additional projects removed 0.00075% of Johnson's seagrass critical habitat ( $0.17 \text{ ac} \div 22,574 \text{ ac} \times 100$ ). Together, these projects removed 0.005% of critical habitat in the action area [ $(0.17 \text{ ac} + 0.96 \text{ ac}) \div 22,574 \text{ ac} \times 100$ ]. The loss from this project, alone and in combination with the other projects in the action area, will not affect the conservation value of available critical habitat to an extent that it would affect Johnson's seagrass self-sustaining populations by adversely affecting the availability of suitable habitat in which the species can disperse in the future. Drifting fragments of Johnson's seagrass can remain viable in the water column for 4-8 days (Hall et al. 2006), and can travel several kilometers under the influence of wind, tides, and waves. Because of this, we believe that the permanent removal of critical habitat due to the proposed actions will not appreciably diminish the conservation value of critical habitat in supporting self-sustaining populations.

The third, and final, recovery objective is for populations of Johnson's seagrass and supporting habitat in the geographic range of Johnson's seagrass to have long-term protection through regulatory action or purchase acquisition. Though the affected portions of the project site will not be available for the long-term, thousands of acres of designated critical habitat are still available for long-term protection, which would include areas surrounding the action area.

Based on the above analysis, we conclude that the adverse effects on Johnson's seagrass critical habitat due to the proposed action will not impede achieving the 3 recovery objectives listed above and, therefore will not appreciably diminish the value of critical habitat for the conservation of the species.

## **8 CONCLUSION**

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After reviewing the current status of Johnson's seagrass designated critical habitat, the environmental baseline, the effects of the proposed action, and the cumulative effects, it is our opinion that the loss of 41,614.2 ft<sup>2</sup> (0.96 ac) from the proposed action will not interfere with achieving the relevant habitat-based recovery objectives for Johnson's seagrass. It is our opinion that the proposed action will not impede the critical habitat's ability to support Johnson's

seagrass conservation, despite permanent adverse effects. Therefore, we conclude that the action, as proposed, is likely to adversely affect, but is not likely to destroy or adversely modify, Johnson's seagrass designated critical habitat.

## **8.1 INCIDENTAL TAKE STATEMENT**

NMFS does not anticipate that the proposed action will incidentally take any species and no take is authorized. Nonetheless, any take of any ESA-listed species shall be immediately reported to [takereport.nmfs@noaa.gov](mailto:takereport.nmfs@noaa.gov). Refer to the present Biological Opinion by title, Venetian Causeway Bridge Replacement, issuance date, NMFS ECO tracking number, SERO-2019-03788, and Financial Management Number 422713-2-22-01. At that time, consultation must be reinitiated.

## **8.2 CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

NMFS believes the following conservation recommendations are reasonable, necessary, and appropriate to conserve and recover Johnson's seagrass. NMFS strongly recommends that these measures be considered and adopted.

1. NMFS recommends that FDOT, in coordination with seagrass researchers and industry, support ongoing research on light requirements and transplanting techniques to preserve and restore Johnson's seagrass, and on collection of plants for genetics research, tissue culture, and tissue banking.
2. NMFS recommends that a report of all current and proposed FDOT projects in the range of Johnson's seagrass be prepared and used by FDOT to assess impacts on the species from these projects, to assess cumulative impacts, and to assist in early consultation that will avoid and/or minimize impacts to Johnson's seagrass and its critical habitat. Information in this report should include location and scope of each project and identify the federal lead agency for each project. The information should be made available to NMFS.
3. NMFS recommends that FDOT conduct and support research to assess trends in the distribution and abundance of Johnson's seagrass. Data collected should be contributed to the Florida Fish and Wildlife Conservation Commission's Florida Wildlife Research Institute to support ongoing geographic information system mapping of Johnson's seagrass and other seagrass distribution.
4. NMFS recommends that the FDOT prepare an assessment of the effects of other actions under its purview on Johnson's seagrass for consideration in future consultations.

## 9 REINITIATION OF CONSULTATION

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As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of taking specified in the proposed action is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the Biological Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

## 10 LITERATURE CITED

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